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To Whom It May Concern:

This letter is to certify that Technical Translation Services, member of NOTA, a chapter of the American Translators Association, has translated WO 2005/036041, PCT/EP/2004/009291 into English from German to the best of our ability and knowledge.

Translated by Technical Translation Services.


J.M. Crouvisier

Sworn to before me and subscribed in my presence the 14th day of October,
2005 in Lake County, State of Ohio.


Notary Public



MIRJANA S. ZOVKIC
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In and for the State of Ohio
Lake County
My Commission Expires
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Device for Fastening at Least
One Elongated Object to a Base Part

The invention pertains to a device for fastening at least one elongated object to a base part by means of at least two fastening elements connected to the base part, having a carrier part for holding the object or each object, having a connecting unit which has a fixed guide part that is connected with the carrier part, and a holding part that is in displaceable engagement with the guide part and that can be brought into engagement with a fastening element, and having a further connecting unit that can be brought into engagement with a further fastening element.

A device of this type is known from DE 85 13 784 U. In the previously known device, elongated objects in the form of conducting wires can be fastened by means of strips to an elongated rail as the carrier part. The previously known device has a first connecting unit, which exhibits a fixed guide part connected with the carrier part. The guide part of the previously known device exhibits a pin configured with a head. The head, which is larger in diameter than the cross section of a shaft segment of the pin, is grasped from behind by an elongated rail that is connected with a holding part for a fastening element. The rail is guided by the pin, so the holding part can be displaced relative to the guide part.

Although the previously known device is easy to fasten, and the displaceability of the holding part makes it possible to correct distance discrepancies between the fastening elements, the design of the connecting element in question is relatively bulky, and it is relatively expensive to produce.

The invention is based on the problem of suggesting a device of the type mentioned above that has a relatively compact design and is inexpensive to produce.

According to the invention, this problem is solved by a device of the type mentioned above, in that the guide part is configured with an outer sleeve that surrounds a guide cavity, whereby the guide cavity exhibits a cross section that is longer in the longitudinal direction than in the transverse direction, that the holding part has inside the guide cavity a displaceable inner sleeve with a diameter in the longitudinal direction that is smaller than the diameter of the outer sleeve in the longitudinal direction, and that engagement elements that are in engagement with each other are configured between the walls of the guide part and the walls of the holding part.

Because of the design of the device according to the invention, the holding part is placed in a space-saving way inside the guide part, and is guided directly over the guide part by the engagement elements inside the guide cavity. As a result, the device can be used even under cramped installation conditions, and can be produced inexpensively. In one configuration of a device according to the invention, it is advantageously provided that the engagement elements are formed by guide recesses and guide projections that extend in the longitudinal direction.

In order to achieve an insertion of the holding part into the guide part that is as easy as possible, in a further development of the configuration mentioned above, it is provided that the guide projections are configured on walls of the guide part and the guide recesses are configured on walls of the holding part.

In order to prevent as much as possible the holding part from being pulled out of the guide part, the guide projections in the configuration mentioned above and the associated further development advantageously exhibit a triangular cross section, whereby the side facing the fastening element in the mounting direction onto a fastening element is angled less steeply than the side facing away from the fastening element in the mounting direction.

In order to achieve a good connection with a fastening element with a device according to the invention, in an advantageous configuration the holding part surrounds a continuous holding channel and is configured with inward pointing latching lugs.

In another advantageous configuration of a device according to the invention, for an especially good distance adjustment it is provided that the additional connecting unit is configured in accordance with the connecting unit that exhibits a displaceable holding part, whereby the longitudinal directions of the holding parts are aligned at right angles to each other. As a result, this configuration can be especially well adjusted.

Further advantageous configurations and advantages of the invention are the object of the following description of an embodiment, including references to the figures in the drawing. The following are shown:

Fig. 1 a three-dimensional view of an embodiment of the invention with a connecting unit that exhibits a displaceable guide part and a further fixed connecting unit,

Fig. 2 a three-dimensional view, enlarged with respect to Fig. 1, of the connecting unit that exhibits the displaceable guide part,

Fig. 3 a longitudinal cross section of the connecting unit according to Fig. 2, and

Fig. 4 a transverse cross section of the connecting unit according to Fig. 2.

Fig. 1 shows a three-dimensional view of an embodiment of a device according to the invention made of plastic and having a carrier part that is configured as an elongated cable channel 1. The cable channel 1 exhibits, for an elongated object to be fastened to a base part not shown in Fig. 1, two opposing side walls 2, 3 and a bottom wall 4 that is connected with the side walls 2, 3. The region of the cable channel 1 that is opposite the bottom wall 4 is made open so that the object to be fastened, e.g., a cable, a cable bundle with several cables, a tube or a tube bundle with several tubes, can be inserted between the side walls 2, 3. In a conventional arrangement of the cable channel 1 on a base part, the open side of the cable channel 1 faces the base part and is essentially covered by it.

Configured on the side wall 3 facing the observer, on the edge side facing away from the bottom wall 4 in the representation of Fig. 1, is a web 5, which is aligned approximately at a right angle to the side wall 3 and which projects out from same in the outward direction. The web 5 extends over a certain length of the cable channel 1, for example, over about two thirds of the length of an essentially straight section.

Present at a first end region of the web 5 is a first connecting unit 6, which is configured as a stationary fixed sleeve 7 that extends in the direction of the bottom wall 4 essentially parallel to the side wall 3 and terminates with the bottom wall 4. The fixed sleeve 7 exhibits a roundish cross section and can be slipped onto a fastening element that is connected with the base part, typically made as a threaded bolt welded to the base part.

In addition, a second connecting unit 8 is present at the other end region of the web 5. The second connecting unit 8 exhibits a guide part 9, which is connected with the web 5 and which is configured with an outer sleeve 10. The second connecting unit 8 is additionally equipped with a holding part 12, which exhibits an inner sleeve 11 and which in the representation in Fig. 1, immediately after the production of the device according to the invention is connected, still projecting over the web 5, with the outer sleeve 10 by means of a connecting burr. The outer wall of the inner sleeve 11 is configured with flat sections 13, which are opposite each other and into each of which a guide recess 14 is made.

To receive the intended arrangement of the second holding part 8 that is required for the fastening to the base part, the inner sleeve 11 is inserted with a special tool into the outer sleeve 10 while destroying the connecting burr.

Fig. 2 shows, in a three-dimensional view that is enlarged with respect to Fig. 1, the second connecting unit 8, which exhibits the displaceable guide part 8 *[sic]* with the inner sleeve 11 that is now inserted into the outer sleeve 10. It can be seen in Fig. 2 that a guide cavity 15 of the outer sleeve 10 exhibits a cross section that is greater in a longitudinal direction which, in the embodiment shown, approximately follows the extension of the web 5, than in the transverse direction aligned at a right angle thereto. In the embodiment according to Fig. 2, the cross section is configured approximately rectangular with relatively strongly rounded corner regions.

It can also be seen in Fig. 2, that the inner sleeve 11 lies with the flat sections 13 configured on its outer wall against

likewise flat longitudinal sections 16 of the inner wall of the outer sleeve 10 so that the inner sleeve 11 can be guided relative to the outer sleeve 10 in the longitudinal direction of the guide recess 14 through the longitudinal sections 16 between the transverse sections 17, which lie in the transverse direction of the guide cavity 15 and which serve as edge stops.

Fig. 3 shows the second connecting unit 8 according to Fig. 3 *[sic]* in a cross section in the longitudinal direction of the guide cavity 15. It can be seen in Fig. 3 that configured on the inside of the inner sleeve 11 are a number of latching lugs 18, which are angled towards a mounting side that is towards the top according to Fig. 3. When the second connecting unit 8 is placed on a fastening element that is configured as a threaded bolt, for example, the latching lugs 18 latch with the recesses of the fastening element that are allocated to them, and, due to the high extraction resistance, safeguard the device according to the invention against an unintentional detachment from the base part.

In addition, in Fig. 3 it is also possible to see especially clearly the space, between the transverse sections 17 of the outer sleeve 10 and the inner sleeve 11, that produces the displaceability of the inner sleeve 10 *[sic]* relative to the outer sleeve 12 *[sic]*.

Finally, it can be seen in Fig. 3 that the inner sleeve 11 surrounds a continuous holding channel 19 for the largely play-free encompassing of a fastening element.

In a cross section in the transverse direction of the guide cavity 15, Fig. 4 shows the second connecting unit 8 according to Fig. 2. It can be seen in Fig. 4 that configured on the longitudinal sections 16 of the inner wall of the outer sleeve 10 are guide projections 20, which are configured in a manner complementary to the guide recesses 14 of the inner sleeve 11 and which engage in them. As a result, the inner sleeve 11 is safeguarded against falling out and is guided in its longitudinal displacement. In the embodiment shown, the flanks of the guide projections 20 are configured flattened towards an insertion side, towards the top in the representation according to Fig. 4, of the inner sleeve 11 in order to facilitate the insertion of same into the outer sleeve 10 and the latching with the guide projections 20.